APPENDIX 8A

Waste Management Plan

Summary of Revisions

Revision No.	Description	Author *	Approval *

* Please include date of amendment/approval.

8A.1 PROJECT INFORMATION

8A.1.1 The Shenzhen Western Corridor (SWC) (the Project) is a dual-3 lane carriageway, in the form of an elevated structure with hard shoulders, linking the proposed Deep Bay Link (DBL) to the section of SWC within the boundary of the Mainland. The highway would be the fourth boundary road crossing providing relief to the traffic congestion at the existing boundary crossings.

8A.1.2 The area covered by the Project includes a corridor in Deep Bay and a strip of land along north-western territory of the HKSAR. The section of the highway within the Hong Kong waters is about 3.2 km in length and will be connected to the portion of about 2 km in length to be provided by the Shenzhen authorities. The proposed landing location of the bridge in Shenzhen will be located at Dongjiaotou. The proposed highway will be connected to Deep Bay Link on the Hong Kong side. All the permanent works for the SWC project will mostly be located offshore with certain activities to be carried out on land in the works areas and along the access roads.

8A.1.3 Particulars of the Project are listed below:-

Contract No.	:	XX/XX/XX
Project	:	Shenzhen Western Corridor
Client	:	Highways Department
Consultant	:	”Ove Arup & Partners Hong Kong Ltd”
Main Contractor	:	XXX
Commencement Date	:	mid of 2003
Completion Date	:	end of 2005

8A.1.4 The major works to be undertaken in the Project include:-

- Site clearance and formation
- Dredging of sediment at designated pier sites
- Piling
- Construction of bridge piers
- Construction and installation of bridge sections
- Installation of bridge joints
- Construction of the associated TCSS and E&M facilities
- Testing and commissioning of SWC
- Road and drainage works
- Landscaping works
- Others

8A.1.5 The environmental requirements for the Project are documented in the Environmental Monitoring and Audit (EM&A) manual prepared for the Investigation and Planning Assignment of Shenzhen Western Corridor under Agreement No. CE39/2001.

8A.2 PURPOSES OF THIS DOCUMENT

8A.2.1 The purposes of this Waste Management Plan (WMP)[1] are:-

- to ensure that all construction site personnel will avoid and/or minimise the on site generation of Construction and Demolition (C&D) material, excavated material, marine dredged sediment, chemical waste and general refuse;
- to estimate the quantities of various types of wastes and their time of generation;
- to reuse and recycle the C&D and excavated materials, and to keep the construction site clean and tidy; and
- to propose proper methods of reuse, recycling, handling, storage, transportation and disposal of various types of wastes generated from the Project.

[1] This Waste Management Plan only provides a framework for waste management and implementation of waste mitigation measures for the Shenzhen Western Corridor project. The appointed Contractor shall make amendments to the plan where appropriate and provide full details of the Waste Management Plan.

8A.3 ORGANISATION CHART

8A.3.1 Figure 8A.1 shows the organisation chart listing the key personnel who are responsible for waste management and implementation of waste mitigation measures. The organisation chart will be updated if deemed necessary. Changes in the organisation will be notified to the whole Project Team and to the Client through general correspondence. The duties and responsibilities for all involved personnel are presented in the next section.

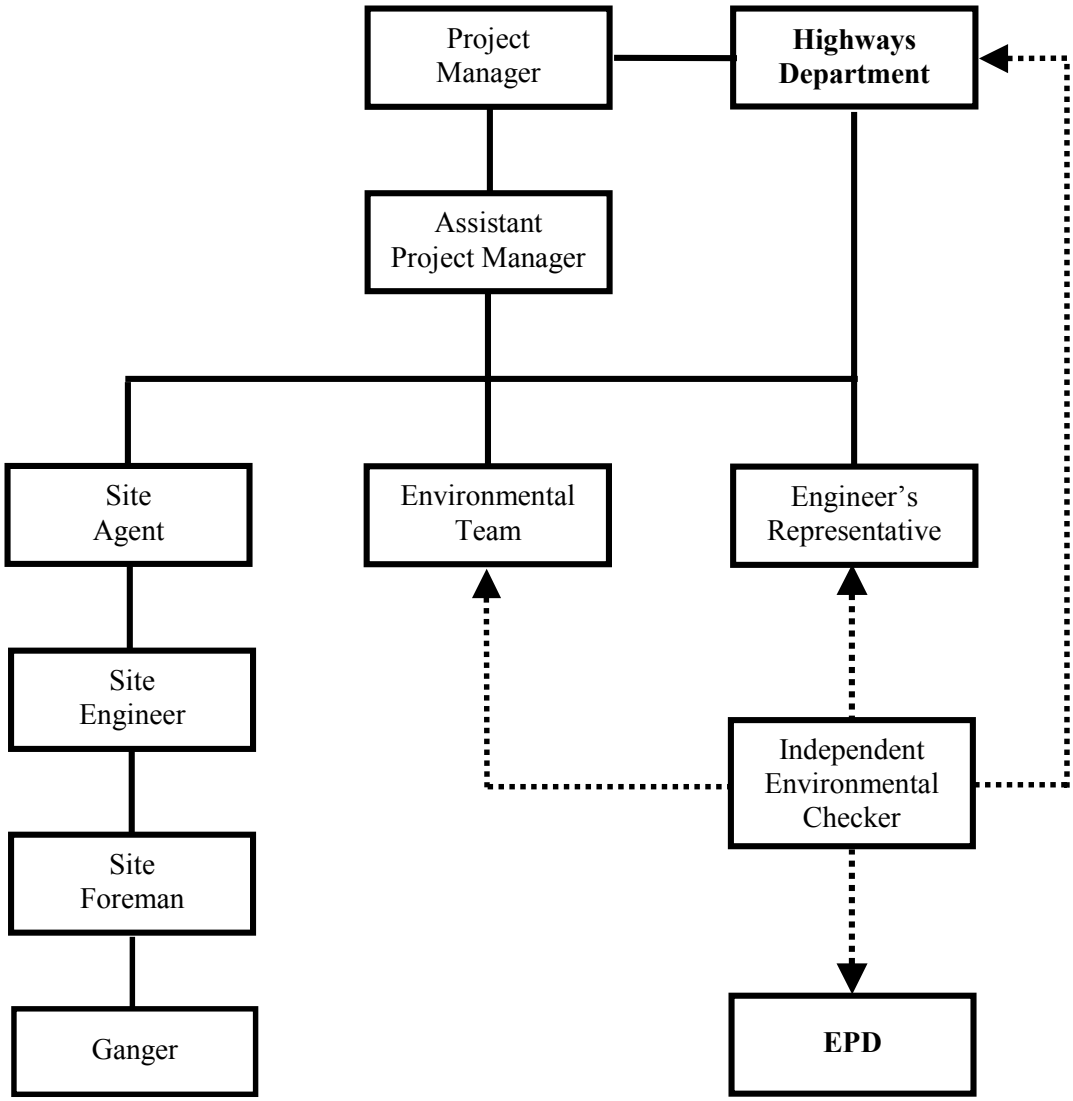


Figure 8A.1 Team Organisation for Waste Management of the Contract.

8A.4 DUTIES AND RESPONSIBILITIES OF ENVIRONMENTAL TEAM

8A.4.1 The duties and responsibilities of the staff involved in the Project for waste management and implementation of waste mitigation measures are listed as follows:-

Project Manager/Assistant Project Manager

The principal of the Project Manager/Assistant Project Manager is to maintain the overall control of the Project. Their responsibilities in view of WMP are to:-

- understand the WMP and appreciate the duties and responsibilities assigned to all levels of staff;
- understand the waste management requirements in the Project and relevant enactments and regulations, i.e. Waste Disposal Ordinance (Cap 354), Waste Disposal (Chemical Waste) (General) Regulation, Dumping at Sea Ordinance, set by the Hong Kong Environmental Protection Department (EPD);
- ensure adequate allocation of resources for WMP implementation;
- liaise with the Independent Environmental Checker (IEC) regularly on matters related to waste management; and
- allow site staff/workers for on site and off site training on waste management.

Environmental Team (ET)

The whole ET, led and managed by the ET leader, should not be in any way an associated body of the Contractor. The responsibilities of ET in this WMP are to:-

- conduct site inspections at a frequency of no less than once per week and appropriate ad hoc site inspections should be carried out if significant environmental problems are identified;
- ensure the Contractor's compliance with the Project's environmental performance requirements;
- monitor the implementation of WMP by the Contractor;
- monitor compliance with conditions specified in the relevant Environmental Permit (EP) and compliance with the Contract Specifications;
- review the construction programme/methodology and comment as necessary;
- advise to the Contractor on environmental improvement, awareness, enhancement matters, etc. on site; and
- compliant investigation, evaluation and identification of corrective measures; and
- liaise with Independent Environmental Checker (IEC) on the environmental performance matters.

Independent Environmental Checker (IEC)

The IEC should not be in any way an associated body of the Contractor or the ET for the Project. The IEC should:-

- review and audit all aspects of the WMP;
- advise on proactive actions;
- conduct random site inspections;

- review the effectiveness of environmental mitigation measures and project environmental performance;
- on a needs basis, audit the Contractor's construction methodology and agree the least impact alternative in consultation with the ET leader and the Contractor;
- check complaint cases and the effectiveness of the corrective measures;
- carry out regular site environmental monitoring and auditing including observations from waste mitigation measures; and
- report the findings of the site inspections and other environmental performance reviews directly to Highways Department and Environmental Protection Department.

Engineer's Representative (ER)

Apart from overseeing the construction works of the Project and monitoring the works undertaken by the various Contractors in order to ensure the works are in accordance with the contract specifications and requirements, ER should also:-

- monitor and audit the performance of the Contractor in implementing WMP on a daily basis;
- provide assistance to the ET and/or IEC as necessary in the implementation of the WMP;
- keep records of the forms and documents as stated in Section 8A.6 of this WMP; and
- inform the Site Agent and endorse the relevant document submitted from the Site Engineer if unreasonable amount of waste is generated during any stage of construction.

Site Agent

Site Agent should:-

- prepare, review and revise the WMP regularly;
- properly implement the requirements specified in the WMP;
- assure all the construction works are up to environmental standard laid down in the WMP;
- provide instructions to all site foremen regarding their responsibilities in waste management implementation;
- liaise with sub-contractors (if any) to ensure an adequate working quality in waste management;
- seek advice from the ET and/or IEC on waste management issues; and
- act as a bridge to convey site management messages and to reflect workforce feedback.

Site Engineer

Site Engineer should:-

- assist the ET and/or IEC during site inspections;
- keep relevant records and provide input to WMP;
- implement site organisation and procedures according to the advice from the Site Agent;
- monitoring the performance of foremen, workers and sub-contractors on a daily basis; and
- report to the Site Agent and complete the relevant document if unreasonable amount of waste is generated during any construction stage.

Foreman and Ganger

They should:-

- assure proper implementation of waste management requirements;
- avoid ordering excess construction material which may eventually become C&D material/waste;
- verify and sign on all records related to waste management; and
- ensure that new workers take part in waste management.

All site staff, workers and sub-contractors should

They should:-

- be aware of the importance and requirements laid down in the WMP;
- cooperate with all levels of staff for implementation of waste management plan; and
- implement waste management procedures.

8A.5 RELEVANT ENACTMENTS, ORDINANCES AND REGULATIONS

8A.5.1 General

The key enactments and regulations set by the EPD of relevance to the Project are listed in the following sub-sections. Other enactments and regulations, if relevant, will be added into the list during the review and revision of the WMP. Key staff of the Contractor should be fully informed of the requirements, and copies of the Ordinances and Regulations should be provided to the concerned personnel.

8A.5.2 Waste Disposal Ordinance

The Waste Disposal Ordinance prohibits any person from using any land or premises for the disposal of wastes unless the person has been authorized by or has obtained a license from the EPD. This Ordinance also provides for the licensing of collection services and disposal facilities for waste.

Enacted under the Waste Disposal Ordinance, the Waste Disposal (Chemical Waste) (General) Regulation requires any person who produces chemical waste2 to register with the EPD, as well as to control the processing, storage, collection, transport and disposal of chemical waste. In addition, the Regulation provides for the licensing of waste collection, transport and disposal activities. Prior to the disposal of chemical waste, the EPD must be notified. The disposal process must adhere to EPD's directions. If certain types of chemical waste are also classified as Dangerous Goods under the *Dangerous Goods Ordinance*, the handling of these wastes will also comply with all the requirements of the *Dangerous Goods Ordinance* and its regulations.

8A.5.3 Public Health and Municipal Services Ordinance

The *Public Health and Municipal Services Ordinance* prohibits the placing or disposal of any solid matter, sediments or waste into any public sewer or drain, or any drain linked to any public sewer or drain, and also prohibits littering.

8A.5.4 Land (Miscellaneous Provisions) Ordinance

The *Land (Miscellaneous Provisions) Ordinance* requires individuals or companies to obtain a dumping license from the Civil Engineering Department (CED) for disposing construction wastes to public filling areas.

8A.5.5 Dumping at Sea Ordinance

The Dumping at Sea Ordinance requires individuals or companies to obtain a dumping license from the EPD for disposing into the designated area in the marine water.

8A.5.6 Other Relevant Documents, Guidelines and Circulars

Other relevant documents, guidelines and circulars include:-

- Technical Memorandum on Environmental Impact Assessment Process, Annex 15 - Guidelines for Assessment of Waste Management Implications, and Annex 7 - Criteria for Evaluating Waste Management Implications
- Hong Kong Planning Standards and Guidelines (HKPSG), Chapter 9 - Environment
- New Disposal Arrangements for Construction Waste, EPD & CED (1992)
- Code of Practice on the Packaging, Labeling and Storage of Chemical Wastes, EPD (1992)

[2] Chemical waste is defined by reference to a list of substances and chemicals documented in Schedule 1 of the Ordinance. Any substance or thing being scrap material, effluent or an unwanted substance or by-product arising from the application of or in the course of any process or trade activity and which contains any of the substances or chemicals specified in the schedule would be regarded as chemical waste if such substance or chemical occurs in such form, quantity or concentration so as to cause pollution or constitute a danger to health or risk of pollution to the environment.

- WBTC No. 2/93, Public Dumps
- WBTC No. 2/93B, Public Filling Facilities
- Practice Note for Professional Persons – Construction Site Drainage (ProPECC PN 1/94), Professional Persons Consultative Committee (1994)
- WBTC No. 16/96, Wet Soil in Public Dumps
- Waste Reduction Framework Plan, 1998 – 2007, Planning Environment and Lands Branch, Government Secretariat (5 November 1998)
- WBTC No. 4/98, Use of Public Fill in Reclamation and Earth Filling Projects
- WBTC No. 4/98A, Use of Public Fill in Reclamation and Earth Filling Projects
- WBTC No. 5/98, On Site Sorting of Construction Waste on Demolition Sites
- WBTC No. 25/99, Incorporation of Information on Construction and Demolition Material Management in Public Works Subcommittee Papers
- WBTC No. 25/99A, Incorporation of Information on Construction and Demolition Material Management in Public Works Subcommittee Papers (Amendment 1)
- WBTC No. 25/99C, Incorporation of Information on Construction and Demolition Material Management in Public Works Subcommittee Papers
- WBTC No. 27/99, Environmental Impact Assessment Ordinance Particular Specification Clause
- WBTC No. 3/2000, Management of Dredged/Excavated Sediment
- WBTC No. 12/2000, Fill Management
- WBTC No. 29/2000, Waste Management Plan
- WBTC No. 6/2002, Enhanced Specification for Site Cleanliness and Tidiness
- WBTC No. 11/2002, Control of Site Crushers
- WBTC No. 21/2002, Trip-ticket System for Disposal of Construction and Demolition Material
- WBTC No. 12/2002, Specifications Facilitating the Use of Recycled Aggregates
- ETWBTC (W) No. 33/2002 Management of construction and demolition material including rock.

The following documents should also be consulted:-

- Environmental Monitoring and Audit (EM&A) manual prepared for the Investigation and Planning Assignment of Shenzhen Western Corridor under Agreement No. CE 39/2001.
- Environmental Permit No. XX/XX/XX

8A.6 WASTE MANAGEMENT

8A.6.1 Identification of Potential Sources of Wastes

Construction activities of the Project are expected to generate a variety of wastes which may include but not limited to:-

- Construction and demolition (C&D) material;
- Excavated material;
- Marine dredged sediment;
- Chemical waste; and
- General refuse.

If not properly managed, the handling and disposal of these wastes may cause environmental impacts and nuisance.

A list containing the types, sources, rough quantities, and disposal methods of the wastes generated within the Project is tabulated in **Table 8A.1**.

Table 8A.1 Sources, Quantity and Proposed Disposal Methods of Various Types of Wastes.

Type of Waste	Source(s)	Estimated Quantity	Disposal method
C&D material	• Hard paved slab • Temporary structures and small houses • Wood/timber from formwork • Material and equipment wrapping • Unusable/surplus concrete/grouting mixes • Damaged/contaminated/surplus construction materials • Other wastes	• 700 m^3 • approx. 20% (140 m^3) would be reusable/ recyclable	• Reuse/recycle whenever possible • Dispose of at public fill area/ landfill/contaminated disposal area depending on the quality of C&D waste
Excavated material	• Soil excavated during foundation works on land (covered by DBL project)	• Minimal	• Reuse/recycle wherever possible • Dispose of at public fill area
Marine dredged sediment	• Marine sediment on the seabed during dredging at bridge pier locations • Sediment on the inlet channel and the proposed access route at Mai Po	<u>Pier Sites</u> • 34,500 m^3 (uncontaminated sediment) • 22,500 m^3 (contaminated sediment) <u>Mai Po</u> • 8,800 m^3 (contaminated sediment)	• Open sea disposal at the South Cheung Chau spoil disposal area or the East Ninepins spoil disposal ground for uncontaminated sediment • Confined marine disposal at East Sha Chau mud pits for contaminated sediment
Chemical waste	• Scrap batteries or spent acid/alkali • Used engine oils, hydraulic fluids and waste fuel • Spent mineral oils/cleaning fluids from mechanical machinery • Spent solvents/solutions, some of which may be halogenated, from equipment cleaning activities	• Minimal	• Transfer to chemical waste treatment facility at Tsing Yi
General	• Waste generated by the workforce,	• 151 tonnes	• Reuse/recycle wherever

Type of Waste	Source(s)	Estimated Quantity	Disposal method
refuse	e.g. food & paper waste		possible • Dispose of at landfills

8A.6.2 Classification of Wastes

C&D Material

C&D material refers to the material arises from C&D activities such as site clearance, dredging of marine sediment/rocks, excavation, construction, refurbishment, renovation, demolition and roadworks. Such material consists of both inert and non-inert materials.

Inert composition of C&D material is termed **public fill** and include rubble, soil, earth, stone, rock, concrete, brick, masonry, demolition material, non-contaminated dredged material, etc. In general, public fill will be reused and recycled as far as possible, either within the contract or in other contract(s) of the Company. The surplus inert C&D material if cannot be reused on site will be delivered to the public filling facilities as the last resort.

On the other hand, the non-inert portion in C&D material can be referred to as **C&D waste**. Examples of C&D waste include bamboo, timber, metal, packaging waste, lubricant and other organic materials. C&D waste can be defined as unsuitable material and should be disposed of properly according to the procedures set in this WMP.

The Contractor is responsible for sorting C&D material into inert and non-inert portions. Inert portion of C&D material should be reused on site as far as possible. Surplus inert C&D material may be disposed of at public filling areas depending on the percentage of inert content. Non-inert portion of C&D material should be reused or recycled and, disposed of at landfills as the last resort.

Excavated Material

Excavated material refers to the material arises from land excavation during foundation works on land. Excavated material consists of mainly soil and broken concrete paving.

Marine Dredged Sediment

Marine dredged sediment refers to the material arises from dredging activities at the locations of bridge pier in Deep Bay during the site formation works. Such material consists of the sediments and solid originally lying on the seabed at and around those bridge pier locations.

Vibrocore and grab sediment samples would be collected during site investigation (SI) for analysis of sediment quality.

Categories L, M and H materials may be generated from the dredging operations. Particular attention will need to be paid to the disposal of these materials.

Chemical Waste

The Waste Disposal (Chemical Waste) (General) Regulation defines chemical waste as any substance being scrap material or unwanted substances specified in its Schedule 1, and provides a complete list of such substances.

Substances likely to be generated by construction activities in the Project, however, would mainly arise from the maintenance of equipment. Some of the examples of potential chemical waste to be generated in the Project are listed in **Table 8A.1**.

General Refuse

The Project would generate general refuse including paper and food waste. The amount that may be produced is dependent on the size of the workforce at site.

8A.6.3 Analysis of Wastes

The estimated quantities of all types of waste materials are shown in **Table 8A.2**. (*The Contractor should provide details*)

Table 8A.2 Estimated Schedule, Type and Quantity of Wastes

Classification	Material	Estimated Quantity (m^3)								
		Aug 03	Sep 03	Oct 03	Not 03	…..	…..	…..	…..	May 05
C&D Material										
To be reused in the Contract	Concrete rock, fenders									
To be recycled	Paper, steel, plastic, etc.*									
For public filling facilities (public fill)	Unusable concrete									
C&D Waste										
To be landfilled	Unusable timber/ bamboo, other refuse*									
Excavated Material										
To be reused in the Contract	Rock, concrete and soil									
For public filling facilities	Others									
Marine Dredged Sediment										
To confined marine disposal facilities (East Sha Chau mud pits)	Contaminated sediment									
To designated open sea disposal site (exhausted marine borrow pits)	Unontaminated sediment									
Chemical Waste										
To designated treatment facilities (Chemical Waste Treatment Facility at Tsing Yi)	Containers of paint, oil, diesel, battery, spent solvent, etc.									
General Refuse										
To be landfilled (WENT)	Food/paper waste									

* Units for paper, steel, plastic, timber and refuse are in kg instead of m^3.

8A.6.4 Hierarchy of Waste Management

Waste management options should be exercised according to the hierarchy described below:-

(1) avoidance and minimization – to avoid and minimize waste through practices or design;

(2) reuse of materials – to reuse construction waste such as uncontaminated soil, used wooden planks and ferric materials;

(3) recovery and recycling – to undertake on-site or off-site waste recycling; and

(4) treatment and disposal – to properly treat or dispose of waste materials according to relevant regulations, guidelines and proper practices.

8A.6.5 Avoidance/Minimization of C&D Material

The Contractor should be responsible for avoiding and minimizing the generation of C&D material. The methods include programming of works, good site management to minimize over ordering and cross contamination, improving site practice, the use of metal formwork, the use of excavated material for filling, etc.

8A.6.6 Sorting Facilities

A specific area on site to facilitate sorting of C&D material would be allocated within the works area as shown in **Figure 8A.2**. The sorting should be carried out as per the classification and should include the separation of C&D material into public fill, C&D waste, as well as the sorting of C&D material by category to facilitate reuse/recycling/return.

Sorting of mixed C&D waste should be carried out on site to reduce the inert C&D material content to less than 30% be weight before this material is delivered to landfill sites. The C&D waste should contain no free water and the liquid content will not exceed 70% by weight. (*The Contractor should provide details of the sorting requirement*)

8A.6.7 Handling, Recycling and Reuse of C&D Material

The Contractor should be responsible for handling, recycling, re-use and return of the suitable C&D material which includes:-

- Concrete/brick/aggregates
- Timber
- Paper/Cardboard
- Metal
- Others (e.g. plastic, foam board etc.)

Concrete/brick/aggregates should be used as public fill wherever practicable. The outlet of concrete/brick/aggregates should be identified and inform the ER for approval. Timber in good condition should be reused and the deteriorated timber should be disposed of to landfill sites. Paper/cardboard, metal, plastic and foam board should be collected and delivered to local recycling factories.

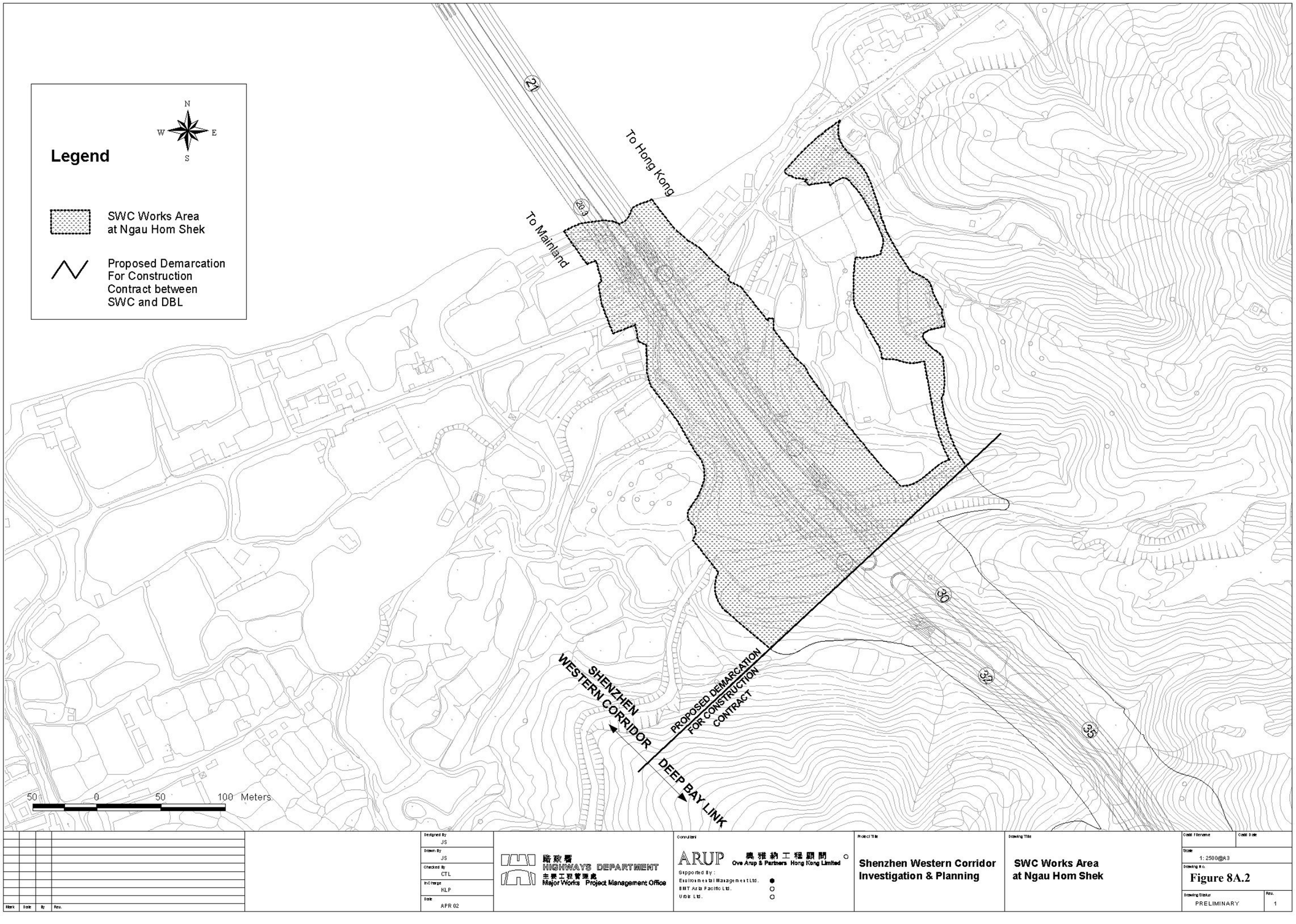
Storage, collection and transport of C&D waste should be carefully planned and implemented to minimize adverse impact on the environment.

The Contractor should reuse or recycle construction/demolition waste with recyclable values, i.e. steel mesh, reinforcement bars, window frames, railings, banisters, wooden planks, etc. These materials should be segregated on site wherever practicable. (*Areas designated for segregation and storage should be shown in a plan which is to be provided by Contractor*). These wastes should either be reused on site or collected by outside licensed waste recycling agents.

The excavated material from the site should be reused within the site as far as possible.

8A.6.8 Disposal of Surplus C&D Material and C&D Waste

The Contractor should comply with the trip-ticket system for the disposal of surplus C&D material as outlined in WBTC No. 5/99 (to be replaced by WBTC No. 21/2002).. The surplus C&D material, which is not recyclable or reusable, should be disposed of to landfills by using dump trucks.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Proposed Demarcation For Construction Contract between SWC and DBL
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土木工程拓展署 Major Works Project Management Office
Consultant
ARUP 奧雅納工程顧問 Ove Arup & Partners Hong Kong Limited
Supported By :
Environmental Management Ltd.
BMT Asia Pacific Ltd.
Urbis Ltd.
Project Title
Shenzhen Western Corridor Investigation & Planning
Drawing Title
SWC Works Area at Ngau Hom Shek
Cadd Filename
Cadd Date
Scale 1: 2500@A3
Drawing No.
Figure 8A.2
Drawing Status PRELIMINARY
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The Contractor should seek the outlet of the inert C&D material, i.e. Public Fill. The final decision of locations of Public Fill in dependent on the proximity and availability of the Public Fill locations.

The dump trucks used for disposal of the inert C&D material should have valid Dumping Licences issued by CED.

Disposal of inert /surplus C&D material should follow the procedures listed below:-

(1) A C&D Material Disposal Delivery Form (DDF) should be produced for each and every vehicular trip transporting C&D material. The Contractor should complete the DDF (See **Figure 8A.3** for example) in duplicate except for the time of departure.

(2) Prior to the vehicle leaving the site, the Contractor should present the completed DDF to the ER. The ER should retain a copy of the Form and return the original to the Contractor. The Form should be carried on board the vehicle at all times throughout the vehicular trip.

(3) For each vehicular trip, the Contractor should obtain a receipt from the operator of the public filling facility or the landfill. The Contractor should submit the original receipt to the ER within 5 working days of the vehicular trip. Late return without any acceptable reason might be regarded as non-compliance by the ER.

(4) The Contractor should acknowledge and permit ER to request and obtain information from the operator of the designated disposal site to verify the receipt and the accuracy of the information on that receipt.

(5) The Contractor should complete the relevant details on a standard form and submit the form to the ER together with the receipt issued by the operator of the public filling facility/landfill after the disposal of the C&D material. Details to be included in the standard form and then receipt are described in WBTC No. 5/99 (to be replaced by WBTC No. 21/2002).

8A.6.9 Handling and Disposal of Excavated Material

For the uncontaminated excavated material, the Contractor should, as far as possible, reuse the excavated material as fill material, either within the Project, in nearby project(s). An alternative is to send the material to exhausted borrow pit area(s). The last resort of handling the uncontaminated excavated material is to dispose of at Public Fill area.

Contaminated Excavated Material

For the disposal of contaminated excavated material, the Contractor should follow the protocols specified in WBTC No. 3/2000 and WBTC No. 12/2000, and should only employ authorised, licensed waste haulers to collect, transport and dispose of the contaminated material.

Appropriate Toxicity Characteristic Leaching Procedure (TCLP) tests should be conducted to determine whether the excavated material is contaminated or not. Excavated material passing the TCLP test should be disposed of at the public fill; otherwise, the contaminated excavated material should only be disposed of at the designated locations approved by the EPD.

Contaminated excavated material should be disposed of once they are produced and will not be stockpiled on site as far as practicable. In the event that short-term storage of contaminated excavated material at the site is necessary, the stockpiled material should be covered with plastic sheeting or tarpaulin, especially during heavy rainstorms.

Alert from appropriate site staff should be delivered to all site workers to avoid contact with any materials suspected to be contaminated. If direct contact with contaminated materials is unavoidable, the Contractor should provide the site workers with appropriate clothing and personal protective equipment (PPE) such as gloves, and should instruct the workers to use these

PPE. In addition, adequate washing facilities should be provided on site for the workers. Smoking and eating during the handling of contaminated materials should be prohibited.

8A.6.10 Handling and Disposal of Marine Dredged Sediment

For the disposal of contaminated marine dredged sediment, the Contractor should follow the protocols specified in WBTC No. 3/2000 and WBTC No. 12/2000, and should only employ authorised, licensed waste haulers to collect, transport and dispose of the contaminated sediment.

The approved Sediment Quality Report (SQR) should be used to identify the locations of the contaminated and uncontaminated sediments. Disposal of the contaminated sediment should be at designated confined marine disposal facilities, i.e East Sha Chau mud pits, and uncontaminated sediment should be at designated open sea disposal sites, i.e. exhausted marine borrow pits.

Contaminated sediments should be disposed of once they are produced and will not be stockpiled on site as far as practicable. In the event that short-term storage of contaminated soil at the site is necessary, the stockpiled material will be covered with plastic sheeting or tarpaulin, especially during heavy rainstorms.

Alert from appropriate site staff will be delivered to all site workers to avoid contact with any materials suspected to be contaminated. If direct contact with contaminated materials is unavoidable, the Contractor should provide the site workers with appropriate clothing and personal protective equipment (PPE) such as gloves, and should instruct the workers to use these PPE. In addition, adequate washing facilities should be provided on site for the workers. Smoking and eating during the handling of contaminated materials should be prohibited.

8A.6.11 Handling of Chemical Waste

The Contractor should identify the chemical waste to be generated from the construction activities, and propose means of packaging, labeling, storage, transportation and disposal in accordance with statutory regulations and guidelines, i.e. Waste Disposal (Chemical Waste)(General) Regulation (Cap 354); and Code of Practice on the Packaging, Labeling and Storage of Chemical Wastes.

The types and quantities of chemical wastes that are likely to be generated during the Contract should be documented.

Some of the potential chemical wastes to be generated from the Project include:-

- Scrap batteries or spent acid/alkali
- Used engine oils, hydraulic fluids and waste fuel
- Spent mineral oils/cleaning fluids from mechanical machinery
- Spent solvents/solutions, some of which may be halogenated, from equipment cleaning activities

Preventive Measures

The Site Engineer should examine and approve the types and quantities of chemicals to be used, for ensuring that the generation of chemical wastes would be minimised throughout the Contract.

Mitigation and Management Measures

(1) The Contractor should observe and comply with the Waste Disposal (Chemical Waste) (General) Ordinance.

(2) The Contractor should apply for registration as a chemical waste producer under the Waste Disposal (Chemical Waste) (General) Ordinance when chemical waste is produced. All chemical waste should be properly stored, labeled, package and collected in accordance with the regulation.

(3) Waste oil, grease, lubricants and batteries are classified as chemical wastes. Their storage, transportation and disposal are subject to control under the Chemical Waste (General) Regulation. Waste oil, grease and lubricants should be delivered to the Chemical Waste Treatment Centre in Tsing Yi for treatment while waste batteries should be disposed at licensed facilities under the Waste Disposal Ordinance.

(4) The Contractor should ensure that all chemical wastes are properly labeled, packaged, and stored at a designated chemical waste storage area within the site. The chemical waste handling and storage requirements should be in accordance with the EPD's Code of Practice on the Packaging, Handling and Storage of Chemical.

Key Requirements in Chemical Waste Handling

Containers used for the storage of chemical wastes should be resistant to the contents, in good condition, and securely closed. Their sizes and types should be in accordance with the Code of Practice. Labels showing the nature of chemical waste in both English and Chinese should be properly displayed on the containers.

Storage areas should be clearly labeled as chemical waste storage area in both English and Chinese and should be used solely for the storage of chemical wastes. These storage areas should be enclosed on at least 3 sides with adequate ventilation and coverage to prevent rainfall. An area should be designed to allow for proper separation of incompatible materials and should have impermeable floor and bunding of sufficient capacity to accommodate 110% of the volume of the largest container or 20% of the total volume of waste stored in the area, whichever larger.

Chemical waste disposal should be via licensed waste collectors to licensed chemical waste disposal facilities.

Corrective measures in case of chemical leakage/spillage

Under cases of chemical leakage or spillage, the Contractor should:-

- keep untrained personnel at a safe distance away from the leakage/spillage area;
- enhance ventilation by opening the doors and windows if the leakage/spillage is in enclosed area;
- initiate emergency evacuation and call for emergency service if leakage/spillage involves highly toxic, volatile or hazardous materials;
- allow trained personnel with appropriate PPE to carry out immediate remediation works;

If the leakage/spillage is within the storage area where the spillage is contained in the enclosed chemical waste storage area, the liquid should be transferred into appropriate chemical waste containers by suitable handheld equipment (e.g. hand-operated pumps, scoops and shovel). If the spillage quantity is small, the spillage should be covered and mixed with suitable absorbing materials such as tissue paper, dry soft sand or vermiculite. The resulting slurry should be treated as chemical waste and transferred to suitable containers for disposal.

If the leakage/spillage is in other areas, immediate action is required to contain the spillage. Suitable liquid absorbing materials such as tissue paper, dry soft sand or vermiculite should be used to cover the spill. The resultant slurry will be treated as chemical waste and transferred into containers for proper disposal.

In case of significant emergency situation (e.g. leakage of huge amount of fuel oil or splash of chemical waste in works area/sea), the Contractor should notify the relevant government departments (e.g. Marine Department, Fire Services Department, EPD, etc.) for the follow-up actions.

8A.6.12 Minimisation, Storage and Disposal of General Refuse

The Contractor should be responsible for minimizing, storage and disposal of general refuse. The recyclable material should be separately collected to facilitate recycling.

Preventive Measures

The IEC and the Site Supervisors should raise the awareness of the workforce in minimizing the generation of refuse. The site office staff of the Contractor should be encouraged to reduce paper usage and to use both sides of paper. The Contractor should also encourage site staff to use reusable rather than disposable dishware by displaying notice/poster on site.

Mitigation and Management Measures

The Contractor should ensure that general refuse is stored in enclosed bins separated from C&D wastes for regular removal. The Contractor should also ensure that refuse burning on site must not be practiced.

Aluminium cans and paper waste should be segregated for collection by waste recycling firms if the volumes are large enough to warrant such collection.

The Contractor should employ a licensed contractor to collect general refuse for disposal on a weekly basis or as necessary. The disposal of general refuse should be at landfill.

Figure 8A.3 Example of Disposal Delivery Form

Construction and Demolition Material Disposal Delivery Form

Department : Contract No. :

Contractor :

Contract Title :

Location of Site :

Location of Public Filling Facility/Landfill * :

Vehicle Registration No. : Date :

Approximate Load : Full / three quarter / half / one quarter *

Remark :

Time of Departure : Authorised Chop of
Engineer's Representative/
Architect's Representative *

** Delete whichever inappropriate*

Authorised Chop of
Operator of Designated Public Filling Facility/Landfill *

8A.6.13 Site Cleanliness

The Contractor should maintain a clean and tidy condition of the site. A daily checklist should be included to facilitate the ER to check the Contractor's compliance in implementing the site cleanliness. The Contractor should:-

- ensure that all vehicles/vessels containing contaminated materials are suitably covered to limit potential dust emissions and that tailgates/gates are sealed;
- maintain records of the quantities of contaminated material generated and disposed of;
- employ licensed waste haulers to collect and transport wastes to licensed disposal points;
- ensure that wastes are stored properly in designated storage points;
- ensure that wastes are removed in a timely manner;
- ensure that the waste storage areas are cleaned regularly; and
- ensure that general refuse is covered in enclosed containers to minimize windblown litter and dust during transportation as far as practicable.

(*A daily checklist for site cleanliness should be provided by the Contractor)*

8A.7 MONITORING AND AUDITING ON WASTE MANAGEMENT

Daily monitoring should be carried out by the Contractor to ensure that the requirements of the WMP are properly implemented and to facilitate the ET and the IEC to monitor and audit the Contractor's performance in implementing the WMP.

Regular site inspections should be conducted by the ET of at least once per week, and ad hoc site inspections should be carried out once significant environmental problems in waste management issues are encountered.

Random site inspections should be conducted by the IEC in order to audit the environmental performance of the Contractor and to validate the audit results provided by the ET. The IEC should report directly to the Highways Department and EPD as part of the IEC's duties.

(*A checklist for monitoring and audit should be provided by the Contractor*)

8A.8 TRAINING ON WASTE MANAGEMENT

8A.8.1 The ET would be responsible for providing appropriate environmental awareness training to the site staff. The training should be in form of briefing, with focus on increasing the site staff's awareness and drawing their attention to waste management issues and the importance of waste generation minimization.

8A.8.2 The training materials should include, but not limited to, the concepts of site cleanliness and appropriate waste management procedure such as waste reduction, reuse, recycling, waste segregation and disposal.

8A.8.3 The level of training should be dependent on the role of the site staff, where training for site worker should emphasize on the procedural aspects while that for site supervisory personnel should emphasize on the management and monitoring issues.

8A.8.4 The Contractor should make sure such training is delivered to all site workers, either by the ET or by trained site supervisory personnel, on an as-needed basis. Details of such training courses including date, time, and names of the instructor/attendees should be recorded.

8A.9 RECORDS AND REPORTS ON WASTE MANAGEMENT

8A.9.1 The Contractor should keep adequate and proper records, i.e. delivery tickets, photographs and measurement records, relating to the implementation of the WMP and submit the records to the ER only a monthly basis within the first week of the following calendar month.

8A.9.2 The Contractor should submit a report on the implementation of the WMP in a form to be agreed by the ER after the completion of the Contract. The report should include the following information and any other information as the ER may consider appropriate:-

(1) the quantities of different types of wastes as estimated at the commencement of the Contract;

(2) a statistics on the monthly quantities of different types of wastes generated and their disposal method; and

(3) reasons for any significant difference between the estimated quantities at (a) and the actual quantities at (b).

(*Record forms should be provided by the Contractor*)

In the Event of Non-compliance

8A.9.3 If any event of non-compliance is observed during the site inspections by ET or IEC, the following corrective actions should be initiated:-

1. The Contractor, ET leader and the ER should be notified.
2. The Contractor should check the actual works procedure, propose suitable corrective/ remedial action(s), and submit to the ER within three working days upon notification.
3. The ER should, together with ET, check and evaluate the Contractor's proposal on the remedial action and supervise the implementation of the proposed remedial action.
4. The ET should try to identify the cause of such non-compliance, and discuss with the Contractor and the ER on the remedial actions and undertake additional site inspections, specifically on the remedial action, until the event non-compliance is not observable.
5. The ET should take log of such non-compliance event in the regular monthly EM&A report.

In the Event of Complaint

8A.9.4 If any environmental complaint regarding the waste issues from the public is received by the IEC, the following corrective actions should be initiated:-

1. The Contractor, ET leader and the ER should be notified and distributed with the received environmental complaint form/letter once the complaint is received.
2. The Contractor and the ET should, within two working days, try to identify the possible cause(s) of the problem and provide the ER the relevant site log with the types and locations of works during the complaint period/date.
3. The Contractor, ET leader, ER and IEC should hold a meeting in order to determine (i) if the nuisance was resulted from the site work and (ii) if the complaint is valid.
4. If proven that the complaint is valid, the Contractor should propose suitable mitigation measure(s) and obtain approval from the ER within two working days after the meeting.
5. The ER should, together with the ET, supervise the implementation of the proposed mitigation measure(s) by the Contractor.

6. The ET should report the investigation results and subsequent actions taken, including follow-up EM&A at the complaint area, to the ER after implementation of the mitigation measure(s).
7. Upon receiving of the investigation report, the ER should respond to the complaint.
8. If no further comments or complaints are received from the complaint within two weeks after responding to the complaint, the complaint record should be closed; otherwise procedures starting from step 3 should be repeated.
9. The ET should take log of the complaint record in the regular monthly EM&A report.

(*Please refer to EM&A manual for environmental complaint form*)